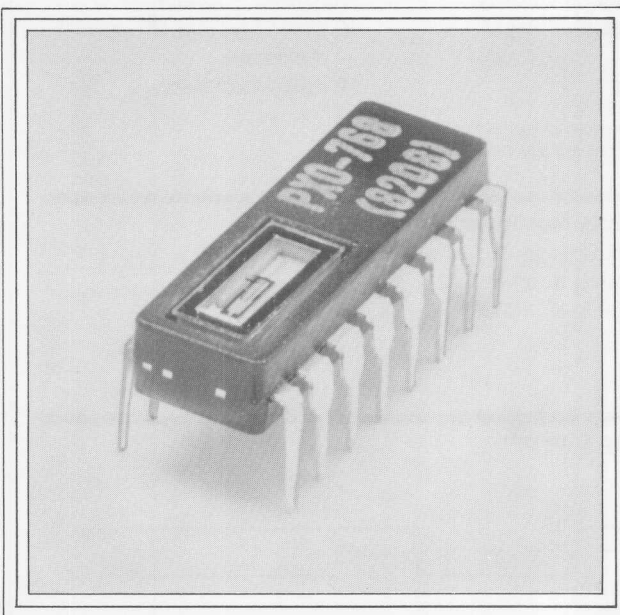
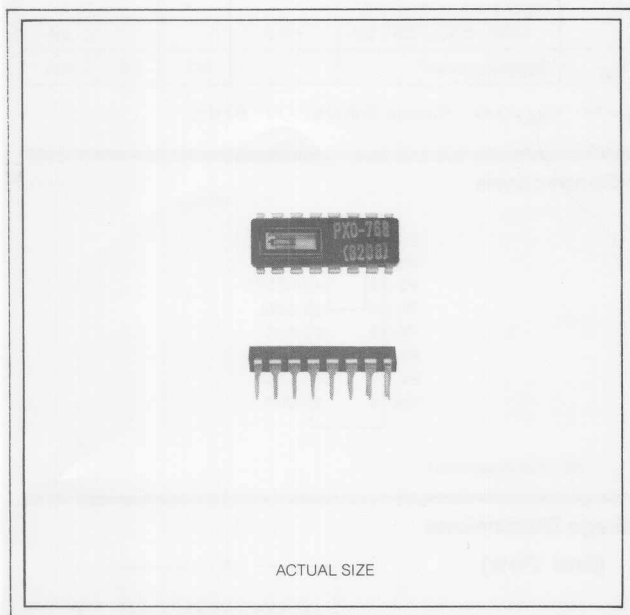




Programmable Crystal Oscillator

PXO Series
0.002 Hz to 2 MHz



Features

- Provides 57 different frequencies from a single quartz crystal.
- Covers broad frequency range: 0.002 Hz to 2 MHz
- Packaged in standard 16-pin DIP containing both IC and crystal.
- Laser trimmed for high accuracy.
- Low power consumption.
- Low aging.
- TTL compatible.

Description

The Programmable Crystal Oscillator PXO Series can be easily programmed to generate any one of 57 different frequencies in the range 0.002 Hz to 2 MHz.

All frequencies generated are derived from a single built-in quartz crystal oscillator and exhibit the same high levels of accuracy and stability as those of the base frequency supplied by the crystal.

The PXO Series is a low-power device containing a quartz crystal and a CMOS IC, both packaged in a standard 16-pin DIP. The oscillator operates in the range 200 kHz to 2 MHz.

Standard Frequencies*

MODEL	BASE FREQUENCY	OUTPUT FREQUENCY RANGE
PXO-32768*	327.68 kHz	0.00273 Hz to 327.68 kHz
PXO-600*	600 kHz	0.005 Hz to 600 kHz
PXO-768*	768 kHz	0.0064 Hz to 768 kHz
PXO-1000*	1 MHz	0.0083 Hz to 1 MHz
PXO-2000*	2 MHz	0.01667 Hz to 2 MHz

*Other frequencies available.

Specifications

Specifications are typical unless otherwise noted and are subject to change without notice.

Calibration tolerance*

PXO-32768	±10 ppm
All others	±100 ppm
Frequency stability**	±0.015%, -10 to +70° C
Voltage coefficient	10 ppm/V typical, 25 ppm/V maximum
Aging	10 ppm maximum first year

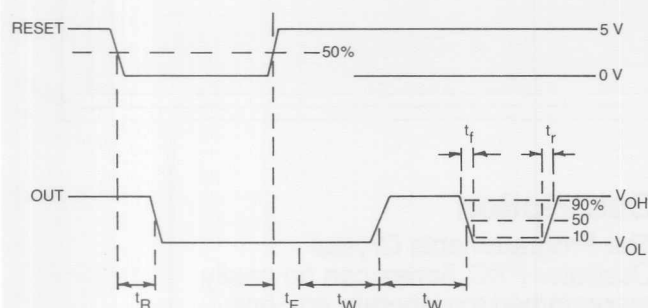
*Tighter tolerances available.

**Does not include calibration tolerance.

Absolute Maximum Ratings

Supply voltage	-0.3 to +10 V
Operating temperature	-10 to +70°C
Storage temperature	-30 to +85°C

Timing Diagram



Switching Characteristics

T_a=25°C V_{DD}=5V C_L=15pF

SYMBOL	PARAMETER	TYP	MAX	UNIT
t _R	Reset delay time		10	μsec
t _E	Timing error after reset released		15	μsec
t _r	Rise time	70		nsec
t _f	Fall time	30		nsec
F _{in}	External oscillator operating frequency		1.5	MHz

Electrical Characteristics

T_a=25°C V_{DD}=5V

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
V _{DD}	Supply voltage	4.0	5.0	6.0	V
I _{OH}	Output current: Hi ¹ (Source)			-1.0	mA
I _{OL}	Output current: Lo ² (Sink)	1.6			mA
V _{IH}	Input voltage: logic 1	V _{DD} -1.0		V _{DD}	V
V _{IL}	Input voltage: logic 0	0.0		1.0	V
I _{IH}	Input current reset: Hi			0.5	μA
I _{IL}	Input current reset: Lo	-15			μA
I _{IH}	Input current Prog 1-6, CSEL, EXC, TEST: Hi			15	μA
I _{IL}	Input current Prog. 1-6, CSEL, EXC, TEST: Lo	-0.5			μA
I _{DD}	Supply current ³		0.7	1.0	mA

¹V_{OH}=4V ²V_{OL}=0.4V ³Crystal: 600 kHz, OUT: 60 kHz

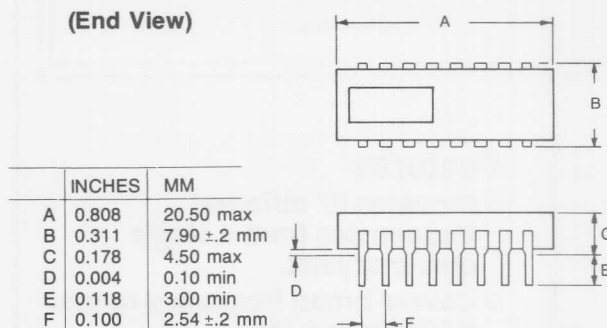
Pin Connections

NC	1	16	V _{DD}
P3	2	15	NC
P2	3	14	RESET
P1	4	13	CSEL
P6	5	12	EXC
P5	6	11	F _{OUT}
P4	7	10	TEST
V _{SS}	8	9	OUT

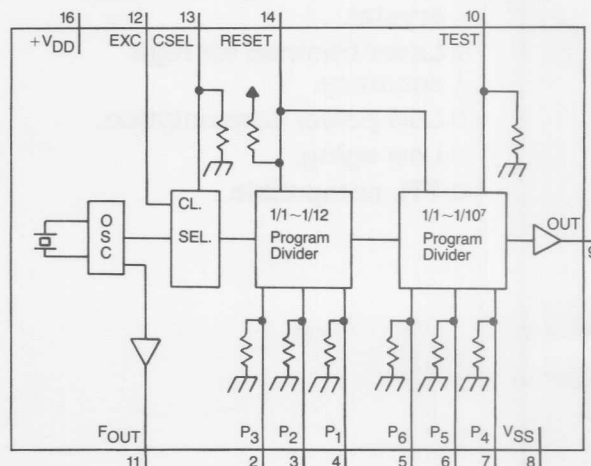
NC: Not connected

Package Dimensions

(End View)



Block Diagram



Pin Functions

Prog 1 through Prog 6 control divide ratio of base frequency.

P1	P2	P3	DIVIDING RATIO	P4	P5	P6	DIVIDING RATIO
0	0	0	1/1	0	0	0	1/1
0	0	1	1/10	0	0	1	1/10
0	1	0	1/2	0	1	0	1/10 ²
0	1	1	1/3	0	1	1	1/10 ³
1	0	0	1/4	1	0	0	1/10 ⁴
1	0	1	1/5	1	0	1	1/10 ⁵
1	1	0	1/6	1	1	0	1/10 ⁶
1	1	1	1/12	1	1	1	1/10 ⁷

OUT: Supplies programmed output frequency with rectangular pulse shape (50% duty cycle, except as noted).

TEST: Setting this terminal Hi multiplies programmed output frequency by 1,000, except when programmed divide ratio is less than 1/1000.

F_{OUT}: Supplies base frequency of internal crystal oscillator.

EXC: External clock input.

CSEL: Clock select. Setting this terminal Hi causes the divider to count the frequency of an external clock instead of the internal clock.

RESET: Setting this terminal Lo resets all counters and sets output to Lo.

(All inputs except EXC and RESET have internal pull-down resistor. RESET has pull-up resistor.)

Output Frequencies of Model PXO-32768 (0.00273 Hz - 327.68 kHz)

PROGRAM PIN SETTINGS			P4	P5	P6	P7	P8	P9	P10
			P4	P5	P6	P7	P8	P9	P10
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
0	0	0	327.680K	32.768K	3.2768K	327.68	32.768	3.2768	0.32768
0	0	1	32.768K	3.2768K	327.68	32.768	3.2768	0.32768	0.03277
0	1	0	163.840K	16.384K	1.6384K	163.84	16.384	1.6384	0.16384
0	1	1	109.226K	10.9226K	1.09226K	109.226	10.9226	1.09226	0.10923
1	0	0	81.920K	8.192K	819.2	81.92	8.192	0.81920	0.08192
1	0	1	65.536K	6.5536K	655.36	65.536	6.5536	0.65536	0.06554
1	1	0	54.613K	5.4613K	546.13	54.613	5.4613	0.54613	0.05461
1	1	1	27.306K	2.7306K	273.06	27.306	2.7306	0.27306	0.02731

*33% duty cycle **40% duty cycle

Output Frequencies of Model PXO-600 (0.005 Hz - 600 kHz)

UNIT: Hz

PROGRAM PIN SETTINGS			P4	P5	P6	P7	P8	P9	P10
			P4	P5	P6	P7	P8	P9	P10
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
0	0	0	600K	60K	6K	600	60	6	0.6
0	0	1	60K	6K	600	60	6	0.6	0.06
0	1	0	300K	30K	3K	300	30	3	0.3
0	1	1	200K	20K	2K	200	20	2	0.2
1	0	0	150K	15K	1.5K	150	15	1.5	0.15
1	0	1	120K	12K	1.2K	120	12	1.2	0.12
1	1	0	100K	10K	1K	100	10	1	0.1
1	1	1	50K	5K	500	50	5	0.5	0.05

*33% duty cycle **40% duty cycle

Output Frequencies of Model PXO-768 (0.0064 Hz - 768 kHz)

UNIT: Hz

PROGRAM PIN SETTINGS			P4	P5	P6	P7	P8	P9	P10
			P4	P5	P6	P7	P8	P9	P10
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
0	0	0	768K	76.8K	7.68K	768	76.8	7.68	0.768
0	0	1	76.8K	7.68K	768	76.8	7.68	0.768	0.0768
0	1	0	384K	38.4K	3.84K	384	38.4	3.84	0.384
0	1	1	256K	25.6K	2.56K	256	25.6	2.56	0.256
1	0	0	192K	19.2K	1.92K	192	19.2	1.92	0.192
1	0	1	153.6K	15.36K	1.536K	153.6	15.36	1.536	0.1536
1	1	0	128K	12.8K	1.28K	128	12.8	1.28	0.128
1	1	1	64K	6.4K	640	64	6.4	0.64	0.064

*33% duty cycle **40% duty cycle

Output Frequencies of Model PXO-1000 (0.0083 Hz - 1 MHz)

UNIT: Hz

PROGRAM PIN SETTINGS			P4	P5	P6	P7	P8	P9	P10
			P4	P5	P6	P7	P8	P9	P10
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
0	0	0	1M	100K	10K	1K	100	10	1
0	0	1	100K	10K	1K	100	10	1	0.1
0	1	0	500K	50K	5K	500	50	5	0.5
0	1	1	333.3K	33.3K	3.3K	333.3	33.3	3.3	0.33
1	0	0	250K	25K	2.5K	250	25	2.5	0.25
1	0	1	200K	20K	2K	200	20	2	0.2
1	1	0	166.6K	16.6K	1.6K	166.6	16.6	1.66	0.16
1	1	1	83.3K	8.3K	833.3	83.3	8.3	0.83	0.083

*33% duty cycle **40% duty cycle

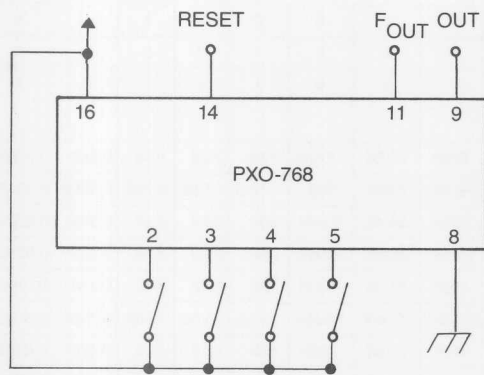
Output Frequencies of Model PXO-2000 (0.01667 Hz - 2 MHz)

UNIT: Hz

PROGRAM PIN SETTINGS			P4	P5	P6	P7	P8	P9	P10
			P4	P5	P6	P7	P8	P9	P10
P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
0	0	0	2M	200K	20K	2K	200	20	2
0	0	1	200K	20K	2K	200	20	2	0.2
0	1	0	1M	100K	10K	1K	100	10	1.0
0	1	1	666.6K	66.6K	6.6K	666.6	66.6	6.6	0.66
1	0	0	500K	50K	5K	500	50	5	0.5
1	0	1	400K	40K	4K	400	40	4	0.4
1	1	0	333.3K	33.3K	3.3K	333.3	33.3	3.3	0.3
1	1	1	166.6K	16.6K	1.6K	166.6	16.6	1.6	0.16

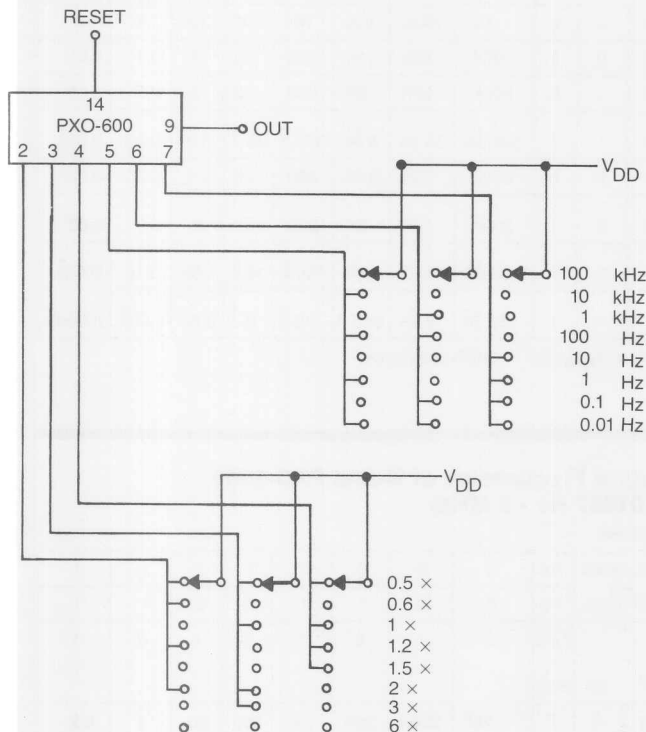
*33% duty cycle **40% duty cycle

APPLICATION 1: Baud Rate Generator

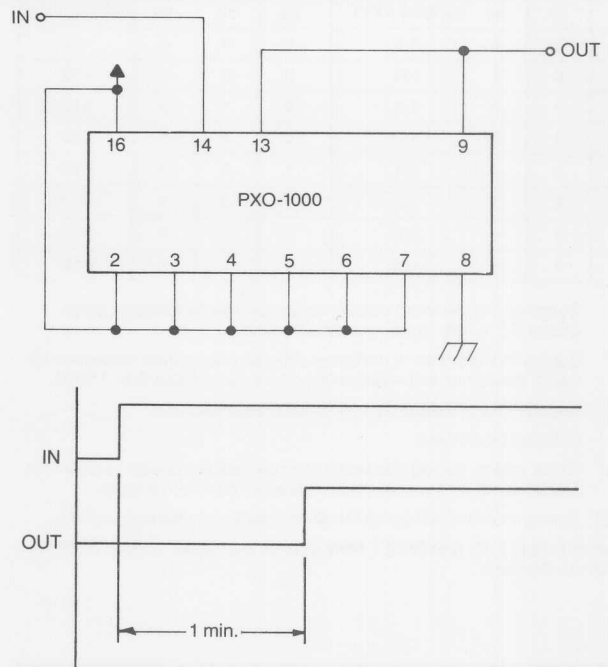


CLOCK FREQ. kHz	19.2	38.4	76.8	153.6	768
BAUD RATE bps	1200	2400	4800	9600	48000
Pin 2 (P3)	0	0	1	1	0
Pin 3 (P2)	0	1	0	0	0
Pin 4 (P1)	1	0	0	1	0
Pin 5 (P6)	1	1	0	0	0

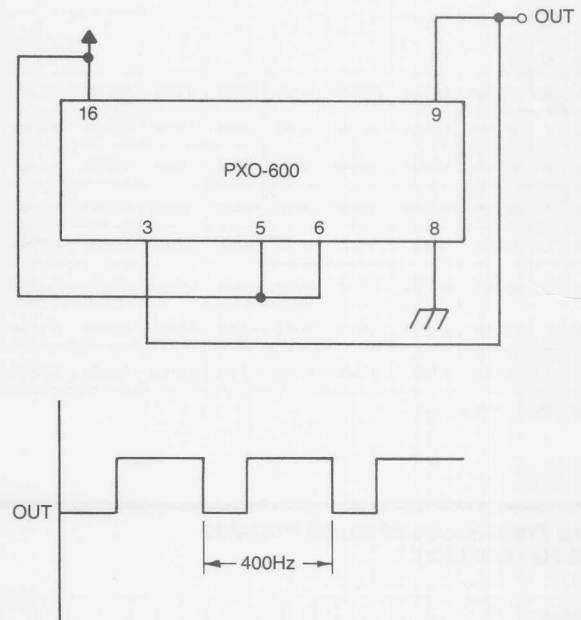
APPLICATION 2: Square Wave Generator providing 0.005Hz to 600kHz



APPLICATION 3: One Shot Timer



APPLICATION 4: Example of non-standard output (duty cycle not 50%)



STATEK CORPORATION
512 N. Main, Orange, CA 92668
Telephone: (714) 639-7810
Telex: 67-8394 TWX: 910-593-1355